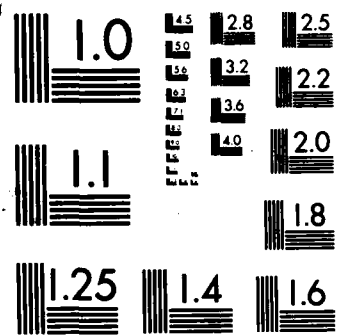


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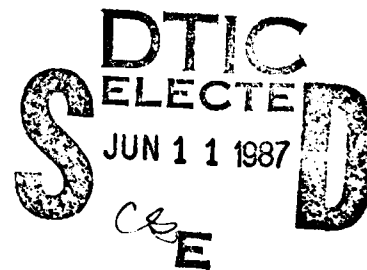
**HAZARDOUS WASTE STAFF ASSISTANCE
SURVEY, McGUIRE AFB NJ**

ELLIOT K. NG, MAJ, USAF, BSC

ROBERT A. TETLA JR, 1LT, USAF, BSC

April 1987

Final Report



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**USAF Occupational and Environmental Health Laboratory
Human Systems Division (AFSC)
Brooks Air Force Base, Texas 78235-5501**

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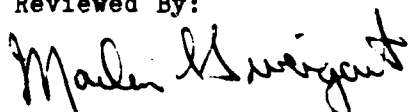

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Item 11 continued

Most importantly, a comprehensive waste analysis plan and hazardous waste training and education program should be developed. Finally, many shops have already taken the initiative to reduce waste by exploring opportunities such as product substitution, procuring a solvent recovery unit, and taking advantage of solvent leasing; as a result, additional opportunities at this time are limited.

ACKNOWLEDGMENT

The authors wish to thank the personnel at McGuire AFB and the New Jersey Air National Guard who provided information and logistic support during our visit. Mr Martin Eisenheart and Mr Bill Flockheart, 438 ABG/DEEV, and the Bioenvironmental Engineering Shop, USAF Clinic/SGPB, were especially supportive of the mission both during and after the field survey.

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EXECUTIVE SUMMARY

The hazardous waste program at McGuire AFB is informal and relies heavily on the participation of the Environmental Planning Office, DEEV. This dependency on DEEV tends to insure proper disposal of waste, however, increased participation by the Base Bioenvironmental Engineering (BEE) Shop, SGPB, along with personnel from using organizations will be necessary for refining and advancing the existing program. Most importantly, a comprehensive waste analysis plan and hazardous waste training and education program should be developed. According to the proposed Air Force hazardous waste regulation, i.e., AFR 19-11, the BEE should be responsible for developing the waste analysis plan. However, the BEE and DEEV should jointly develop the training and education program. Finally, many shops have taken their own initiative to reduce waste by exploring opportunities such as product substitution, procuring a solvent recovery unit, and taking advantage of solvent leasing; as a result, additional opportunities for waste minimization are limited at this time.

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I. INTRODUCTION

In a 12 Aug 86 letter (Appendix A), USAF Clinic McGuire/SGPB, and Environmental Planning, 438 ABG/DEEV, requested the USAF Occupational and Environmental Health Laboratory, Consultant Services Division, Environmental Quality Branch, USAFOEHL/ECQ, to accomplish a hazardous waste staff assistance survey. The scope of this survey was to address hazardous waste management practices and to explore opportunities for hazardous waste minimization.

The survey was conducted by Major Elliot K. Ng and 1Lt Robert A. Tetla, USAFOEHL Hazardous Waste Function, USAFOEHL/ECQ, from 17 Nov 86 to 26 Nov 86.

II. BACKGROUND

1. Base Description

McGuire AFB (MAFB) is situated in the semirural northeastern section of Burlington County three miles southeast of neighboring Ocean County in southern New Jersey. The base serves as a host to the 438th Military Airlift Wing as well as 22 tenants such as the Headquarters for the 21st Air Force, the 514th Military Airlift Wing, and the 108th and 170th New Jersey Air National Guard (NJANG) Units.

2. Hazardous Waste Program

The hazardous waste program is fairly informal. When shop personnel have hazardous waste to turn-in to the Hazardous Waste Storage Yard (HWSY), Building 23-10, they contact either Mr Martin Eisenheart or Mr Bill Flockheart at the Environmental Planning Office, DEEV. Normally, the shop knows the contents of the waste drums, so no paperwork is required during turn-in. However, DEEV performs a drum inspection for leakage, proper labeling, cleanliness, and for a 3-5 inch expansion pocket before acceptance. DEEV also assures each drum is covered with a plastic lid and no more than three drums are placed on each pallet. Finally, DEEV tries to maintain no more than 200 drums of waste at the HWSY.

When a drum of unknown or questionable waste is received, Mr Flockheart samples the waste to determine its composition. Samples are normally sent to USAFOEHL, Analytical Chemistry Division, USAFOEHL/SA, for analysis; but, an on-call contract with a local laboratory is available for nonroutine analyses of hazardous wastes, PCBs, and asbestos.

When DEEV needs to dispose of hazardous waste stored in the HWSY, they Complete DD Form 1348-1 (Figure 1) and the United States Environmental Protection Agency (USEPA) uniform manifest before turning over the waste to the Defense Reutilization Management Office (DRMO) for contractual disposal. Occasionally the disposal contractor will perform spot-check analysis on wastes to validate the composition.

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Figure 1. DD Form 1348-1

III. PROCEDURE

The first step of the survey was to review the base's hazardous waste management plan. From our review, we established twelve categories of waste generated on McGuire AFB and developed a waste disposal survey form (Appendix B) to inventory waste disposal practices on base. After this preliminary waste assessment, the survey team proceeded to visit all major industrial shops on MAFB to observe industrial activities, discuss industrial waste disposal practices with shop personnel, and handout the waste disposal survey form. The following individuals were contacted to discuss their respective areas of responsibility in the hazardous waste program:

Capt Tamere Sollie, Chief, Bioenvironmental Engineering,
SGPB, Autovon 440-2411

2Lt David Wannigman, Base Bioenvironmental Engineer,
SGPB, Autovon 440-2411

Mr Martin Eisenheart, Chief, Environmental Planning,
DEEV, Autovon 440-2770

Mr Bill Flockheart, Environmental Protection Specialist,
DEEV, Autovon 440-2770

MSgt Mike Dumont, NCOIC, Bioenvironmental Engineering, 108th
and 170th Air National Guard, Autovon 440-2635

Based on information received on our waste survey forms a summary of the annual forecasted wastes generated on McGuire AFB is shown in Table 1 by category. From Table 1, Column 4 (see Appendix C for calculations), waste oils and fuels comprise 63% of the wastes generated at MAFB but, the procedures to handle wastes oils and fuel are fairly well established. If a waste oil storage tank is not available at the shop, the waste oil is brought by shop personnel to four 2000-gallon underground tanks located behind the civil engineering complex at the old gas station (Building 34-38). One tank is for heavy oils and another is for synthetic oils, a third tank is for PD-680, and the fourth is a spare tank. The NJANG has their own waste oil storage facility, that consists of three above ground tanks located behind the 108th Weapons Maintenance shop (Building 33-31).

TABLE 1
CATEGORIES OF WASTE AT MCGUIRE AFB (MAFB)

CATEGORY	PRODUCT	TOTAL (gal/yr)	% TOTAL CATEGORIES 1-12	%TOTAL CATEGORIES 3-12
1	Waste Oil	17471.00	43.78	---
2	Used Jet Fuels	7860.00	19.70	---
3	Waste PD-680	4725.00	11.84	32.42
4	Waste Fluids	4546.00	11.39	31.19
5	Waste Solvents	1264.50	3.17	8.67
6	Automotive Fuel	1080.00	2.71	7.41
7	Paint Waste and Thinners	1024.00	2.57	7.03
8	Stripping Wastes	932.00	2.34	6.39
9	Battery Acids	468.00	1.17	3.21
10	Waste Antifreeze	410.00	1.02	2.81
11	Developer Wastes *	121.00	0.30	0.83
12	NDI Wastes *	5.00	0.01	0.03
TOTALS:		39906.50	100.00	99.99

* NOTE: THIS DOES NOT INCLUDE THE 438TH NDI SHOP WASTES

Waste oil throughout the base is picked up by a contractor and either sold to Brookhaven National Laboratories for fuel or recycled.

After the deletion of waste oil and waste fuel, the relative quantities of the remaining wastes were recalculated. The results are in Table 1, Column 5, and reveal that over 93% of the remaining wastes are PD-680, fluids, solvents, automotive fuel, paint waste and thinners, and stripper, i.e., categories 3, 4, 5, 6, 7, and 8, respectively.

The next section documents our findings while visiting the industrial activities.

IV. DESCRIPTION OF INDUSTRIAL ACTIVITIES AND WASTE DISPOSAL PRACTICES

A. McGuire AFB

- | | |
|---------------------------------|-------------------|
| 1. 438th Fire Truck Maintenance | Building: 17-08 |
| Shop Supervisor: Mr Selenekovic | AUTOVON: 440-3610 |

438th Fire Truck Maintenance shop is engaged in the repair of fire fighting and support vehicles assigned to the Fire Department. Waste oil and fluids are drummed, taken to the waste oil storage area (Building 34-38), and transferred to underground tanks. Waste antifreeze is drummed and disposed of as hazardous waste. The shop has a Safety Kleen degreasing unit which is serviced by Safety Kleen Corporation, i.e., drains the used degreasant and replenishes the unit, on a routine schedule. This service relieves the base's purchasing and disposal responsibilities for the degreasant (normally PD-680).

- | | |
|---------------------------------|-------------------|
| 2. 463L | Building: 17-50 |
| Shop Supervisor: SMSgt Holloway | AUTOVON: 440-3809 |

Personnel in this shop perform minor and major vehicle repairs on fork lifts, tugs, and aircraft loaders. Waste 15W-40 oil is drummed. Used aircraft cleaning compound (NSN 6850-01-184-3182) is disposed of down the floor drain.

- | | |
|-------------------------------|-------------------|
| 3. 438th FMS Jet Engine Shop | Building: 18-01 |
| Shop Supervisor: MSgt Addison | AUTOVON: 440-2952 |

The Jet Engine Shop personnel build and tear down C-141B jet engines. The shop is comprised of three major areas: the assembly area, the bearing room, and the washrack area.

The assembly area has no chemical usage. The bearing room utilizes four 55-gallon tanks. Two tanks contain Penetone Formula 755 and two tanks contain Penetone TPC solvent. The contents of these tanks are pumped out (every 3-4 months), drummed, and disposed of as hazardous waste. Previously, this shop was using carbon remover and PD-680 instead of Penetone products.

The washrack area consists of seven vats, but only one is in operation because of health and safety considerations. The vat (about 750 gallons) contains Penetone Formula 755, diluted 7:1 with water. Parts are soaked in the vat, raised and allowed to drain before placed on the floor and rinsed off. The rinse water from this operation enters an oil/water separator through a floor drain.

Currently, waste Penetone Formula 755 in the vat is pumped into 55-gallon drums and disposed of as hazardous waste. In the past, the content of the vat was drained into a holding tank located outside the building by opening a valve behind the vat. Also, large parts are not soaked in the vat, but are stripped by using a "bucket and hand" operation in the washrack area with the rinse water going down the floor drain.

4. 438th FMS Test Cell
Shop Supervisor: TSgt Smithson

Building: 18-32
AUTOVON: 440-3003

438th FMS Test Cell tunes and tests approximately 27 TF33P7 aircraft engines per month. The major waste from this shop is synthetic engine oil (approximately 48 quarts per engine). Waste oil is drummed and turned into DRMO for disposal. Aircraft soap (either MSC1, NSN 6850-01-184-3182, or Eldorado, NSN 6850-00-285-4321) used on the engines is mixed 4:1 and rinsed down a drain, into an oil/water separator that is connected to the sewer system. Waste fuel is placed in a separate holding tank and pumped out by POL fuel maintenance personnel

5. Refueling Maintenance
Shop Supervisor: SSgt Thomas

Building: 18-36
AUTOVON: 440-2815

Refueling Maintenance maintains fuel trucks. This shop has a 600-gallon underground tank where contaminated jet and aviation fuel is collected. This tank is pumped out, and the contaminated fuels are taken to the storage area and placed into a centralized holding tank. Waste oils, fluids and antifreeze are drummed and disposed of by contractor.

6. Aircraft Washrack/Corrosion Control
Stripping Area
Shop Supervisor: MSgt Straw

Building: 22-40
AUTOVON: 440-2501/4633

During our visit the aircraft washrack was operated by Galaxy, however, a new contract has been awarded. Galaxy uses Calla 800 soap (mil-C-87936) and PD-680 to wash aircraft. The rinse water from this operation drains to a collection pit that empties into an oil/water separator connected to the industrial sewer (See Figure 2). This collection pit has a screen to keep the solids in the pit. Approximately one drum of sludge per month is removed from the pit and disposed of as hazardous waste.

Corrosion control operates a stripping area for aircraft parts and wheels and is located adjacent to the aircraft washrack. The stripping operation utilizes two stripping tanks that contain either B&B 4411 (mil-R-25134), B&B 9201 (mil-R-83936), or FO 621 (mil-R-83936). Parts are placed in the tanks, removed, and hosed off on the floor. The rinse water and paint sludges from this operation enter the floor drain system. Parts too large to be placed in the tanks are stripped on the floor by applying the stripper with brushes and then hosing it off. The stripping tanks are cleaned out every 2-3 months and the contents are disposed of as hazardous waste.

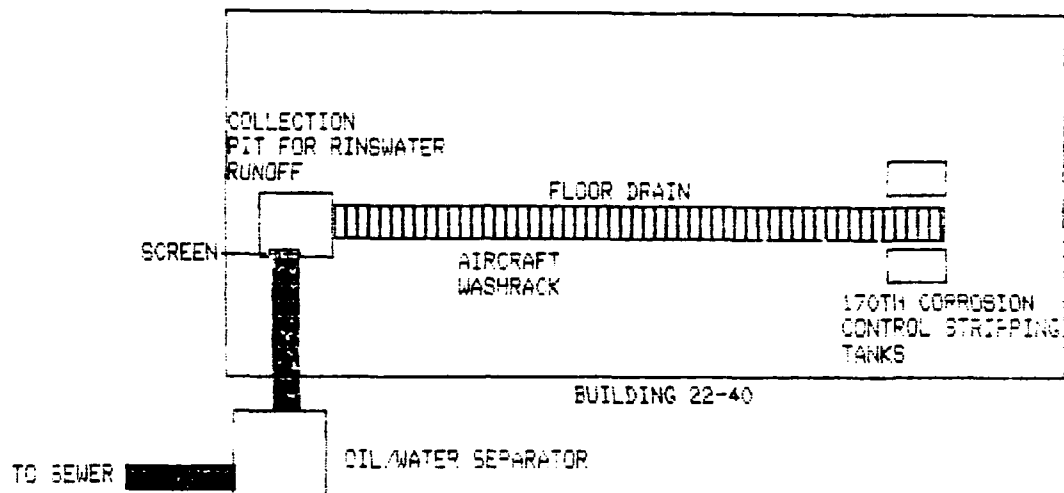


Figure 2. Aircraft Washrack and Corrosion Controls Stripping Area

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|----|---------------------------------------|-------------------|
| 7. | 438th FMS Powered and Non-Powered AGE | Building: 22-53 |
| | Shop Supervisor: MSgt Sartor | AUTOVON: 440-3479 |

438th FMS Powered and Non-Powered AGE maintains flight line support equipment. Waste oil goes to an underground tank and is pumped out by contractor. Waste hydraulic fluid is stored in 55-gallon drums. Jet and automotive fuels are stored in 55-gallon drums. Jet fuel is recovered by fuel maintenance personnel and placed back into the main storage tanks and automotive fuel is reused in AGE equipment.

- | | | |
|----|-----------------------------|-------------------|
| 8. | 438th FMS Corrosion Control | Building: 22-53 |
| | Shop Supervisor: MSgt Straw | AUTOVON: 440-2501 |

438th FMS Corrosion Control is responsible for the surface preparation and painting of aircraft and AGE components. Stripping operations consist of sanding and liquid stripping. All liquid stripping is done in Building 22-40. Waste paints and thinners are drummed and disposed of as hazardous waste.

- | | | |
|----|-------------------------------|-------------------|
| 9. | 438th FMS Plastic Shop | Building: 23-15 |
| | Shop Supervisor: TSgt Anspach | AUTOVON: 440-2125 |

The 438th FMS Plastic Shop manufactures, installs and repairs fiberglass components, panels, and other related fiberglass products. The major waste from this shop is acetone. The shop has a new acetone recovery unit (Figure 3), but during the survey the unit was not operational because approval from the fire department was still pending. Waste acetone (about one 55-gallon drum per week) is currently stored at the HWSY and will be recycled when the unit is operational.

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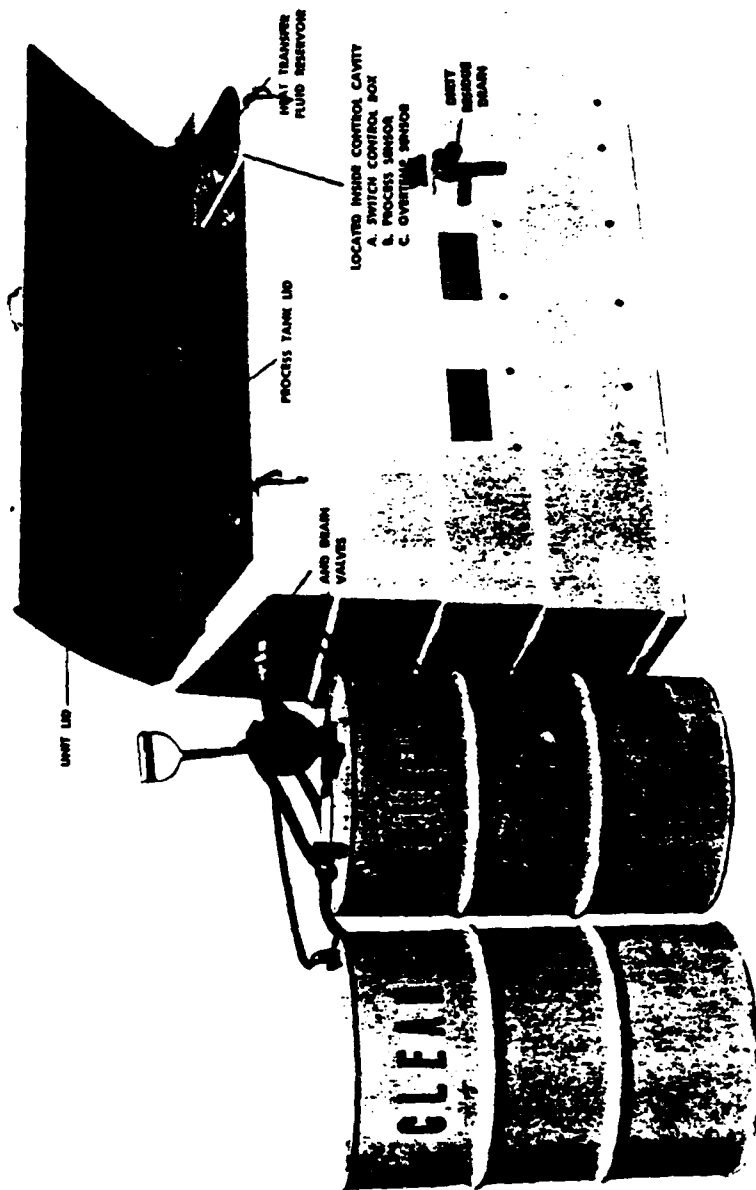


Figure 3. Acetone Recovery Unit

10. 438th ABG Auto Hobby Shop
Shop Supervisor: Mr Dombrowski

Building: 24-15
AUTOVON: 440-4316

The Auto Hobby shop is housed in a "garage type" building containing state-of-the-art equipment for maintenance and repair of privately owned vehicles. About two years ago this shop replaced PD-680 with several Safety Kleen degreasing units. The Safety Kleen units are serviced once a month by the Safety Kleen Corporation. Waste oils and fluids are placed in a 500-gallon underground tank that is pumped out by a contractor. There are no waste paints and thinners generated from the dry paint booth. MSCI aircraft cleaning compound (NSN 6850-01-184-3182) is used to clean the floors.

11. 438th B.M.E. Base Motor Pool
Shop Supervisor: SSgt McNeely

Building: 30-01
AUTOVON: 440-4186

The 438th B.M.E. Base Motor Pool shop works on heavy equipment and snow equipment. There are five Safety Kleen degreasing units in this shop. Waste engine oil is taken to a storage tank and pumped out by a contractor. MSCI aircraft cleaning compound (NSN 6850-01-184-3182) is used to clean the floors.

12. 438th Trans Allied Trades
Shop Supervisor: TSgt Jones

Building: 30-01
AUTOVON: 440-4247

438th Trans Allied Trades is responsible for vehicle body work and painting. Waste paints and thinners are stored in 55-gallon drums and disposed of as hazardous waste. Sludges from the paint booth waterfall are removed and taken to the dump while the water (800-1000 gallons) is drained into the sewer system. A new paint booth is being planned for construction. Waste oil is placed in an underground tank used by the motor pool.

13. 438th Repair and Reclamation
Shop Supervisor: MSgt Broda

Building: 32-09
AUTOVON: 440-2908

The Repair and Reclamation shop inspects and repairs flight controls and landing areas. No chemical wastes are generated in this shop.

14. 438th FMS Wheel and Tire Shop
Shop Supervisor: SSgt Arnold

Building: 32-09
AUTOVON: 440-3810

438th FMS Wheel and Tire shop builds and tears down wheel and tire assemblies. This shop has three PD-680 tanks (approximately 150 gallons each); one is used strictly for cleaning and washing bearings; another contains PD-680 and oil to coat bearings with oil; and a third is used for cleaning and washing wheel rims. Tanks are cleaned out once every 4-6 months. Waste PD-680 is stored in a bowser (located behind the building) prior to being taken to the underground storage tanks behind Civil Engineering. This shop is considering replacing PD-680 with Penetone Formula 724.

15. 438th Refurbish
Shop Supervisor: TSgt Thorn

Building: 32-10
AUTOVON: 440-3748/2986

This shop restores aircraft to "like new" condition through necessary repairs, painting (cargo compartments, flight decks, panels, and the exterior of aircrafts), corrosion control and replacement of aircraft components. Waste paints and thinners are stored in 55-gallon drums in an outside curbed storage area. Approximately five 55-gallon drums of waste are generated every 2-6 months.

B. New Jersey Air National Guard Units

1. 170th CAMS Corrosion Control
Shop Supervisor: TSgt Beam

Building: 18-11
AUTOVON: 440-3052

170th CAMS Corrosion Control shop personnel duties consist of painting, washing, stripping aircraft, and stripping aircraft parts and AGE equipment. There is a 120-day wash cycle for aircraft, i.e., one plane per month. Waste paints and thinners are placed in a 55-gallon drum and disposed of as hazardous waste. B&B 2020 NV aircraft soap (NSN 7930-P2020 NV) diluted 1:4 is used to wash the aircraft while PD-680 is used on the heavily soiled areas. The rinse water from this operation enters an oil/water separator which is connected to the sewer system. Waste stripper, methyl ethyl ketone (MEK), from a cold stripping tank (cleaned out annually) is placed in a 55-gallon drum and disposed of as hazardous waste.

TSgt Beam is the hazardous waste manager for the 170th ANG. He keeps a log of all wastes turned over to DEEV and briefs his personnel annually on hazardous waste disposal procedures. A plan is in-place to construct a 30 feet by 30 feet covered pad with curbing for hazardous waste storage in the washrack area to replace the current waste storage area (Figure 4).

2. 170th CAMS AGE
Shop Supervisor: MSgt Lynas

Building: 19-32
AUTOVON: 440-3235

170th CAMS AGE shop personnel maintain powered aerospace ground equipment. A 50/50 mix of PD-680 and Eldorado aircraft soap (NSN 6850-00-935-0995) is used to wash AGE equipment and is rinsed down the drain to an oil/water separator that is connected to the sewer system. Battery acid (about four gallons per month) is neutralized with sodium bicarbonate and placed in a 55-gallon drum and turned into the disposal yard. Waste oil is drummed and turned in to DRMO.

The outside waste storage area for this building was recently curbed. This shop has a 1000-gallon underground storage tank for JP-4 fuel. There is no record of when this steel tank was installed.

3. 170th CAMS Jet Engine Shop
Shop Supervisors: MSgt Dimatted/MSgt Simpson

Building: 19-29

Shop personnel build and tear down KC-135 Jet engines. Minimal wastes are generated in this shop (one 55-gallon drum of PD-680 every 6 months and one 55-gallon drum each of fuel and oil every 2-4 months) these wastes are taken to the 170th Corrosion Control shop waste storage area.

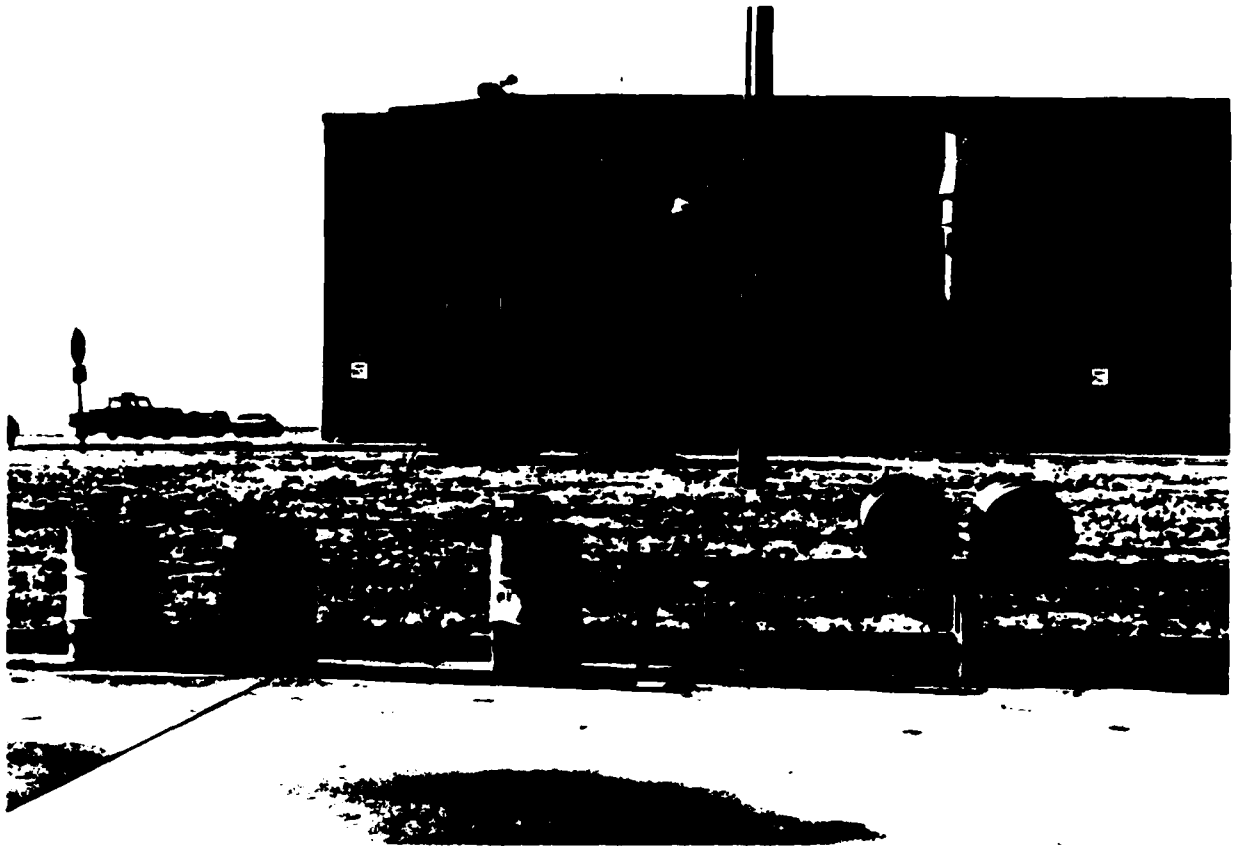


Figure 4. 170th Corrosion Control Shop Waste Storage Area

4. 170th CAMS Fuel Cell Building: 19-31
Shop Supervisor: TSgt Romero

170th Fuel Cell personnel repair and maintain fuel tanks on the KC-135. Minimal wastes are generated in this shop. Any MEK or ethyl methyl ketone (EMK), used is taken to 170th AGE for disposal. Uncontaminated JP-4 (from sampling jet fuel, 1-2 liters) is given to fuel maintenance to be placed back in the base's fuel tanks, or it is drummed and given to the 170th Corrosion Control if it is contaminated.

5. 170th Wheel and Tire Shop Building: 19-31
Shop Supervisor: Sgt Ledwich

170th Wheel and Tire shop personnel build and tear down wheel and tire assemblies. This shop has two PD-680 tanks: one for wheels (approximately 60 gallons) and one for bearings (approximately 25 gallons). One 55-gallon drum of waste PD-680 is generated every six months.

6. 108th Propulsion
Shop Supervisor: MSgt Rockhill

Building: 33-21
AUTOVON: 440-4600

108th Propulsion section personnel disassemble and assemble jet engines, perform parts cleaning operations, and perform inspections of engines and component parts. This shop has one 3-gallon PD-680 tank for bearing cleaning and two 5-gallon PD-680 tanks located in the general parts cleaning room. Waste PD-680 from these tanks is drained into a bucket and taken to the NJANG waste storage area. Sodium hydroxide is used to clean parts coated with carbon. Waste sodium hydroxide from this operation is rinsed down the sink.

7. 108th Pneudralics
Shop Supervisor: Bob Campbell

Building: 33-22
AUTOVON: 440-3049

This shop uses hydraulic fluid on aircraft and in the hydraulic component tester (HCT-13). The tester is drained once per month and holds about six gallons of hydraulic oil. This oil goes to a 500-gallon above ground tank. A PD-680 tank is used to clean parts after disassembly. The tank is cleaned out about once every 1-2 months and the PD-680 is stored in 55-gallon drums and sent to the NJANG waste storage area.

8. 108th Corrosion Control
Shop Supervisor: SSgt Wojciechowicz

Building: 33-22
AUTOVON: 440-4214

108th Corrosion Control shop personnel are responsible for supplying soap and PD-680 to the washrack and performing touchup painting. All painting is done with spray cans and when empty are vented to atmospheric pressure and thrown in the trash.

This shop has a plastic bead blasting unit on order to eliminate chemical stripping done by the Wheel and Tire shop, i.e., normally a Corrosion Control shop responsibility.

9. 108th Non-Destruct Inspection (NDI)
Shop Supervisor: TSgt Skeens

Building: 33-22
AUTOVON: 440-4616

108th NDI shop personnel do both magnetic particle inspection and penetrant inspection. The magnetic particle inspection is a closed system which utilizes magnetic inspect, i.e., either PD-680 or deodorized kerosene, and iron filings with a large magnet to find flaws in aircraft parts. Waste penetrant is stored in 55-gallon drums and disposed of by contractor.

The penetrant inspection (shown in Figure 5) is an open system which uses a penetrant, emulsifier and a rinse area. Parts are sequentially dipped into the penetrant; removed; placed in the emulsifier; rinsed; and allowed to drip dry. Then the part is sprayed with a developer, and passed through a drying oven before inspection and finally rinsed.

A photo lab in the NDI shop uses a fixer and developer in the developing process. The rinse water and chemicals from the process are sent through two silver recovery units at supply before being discharged into the sewer system.

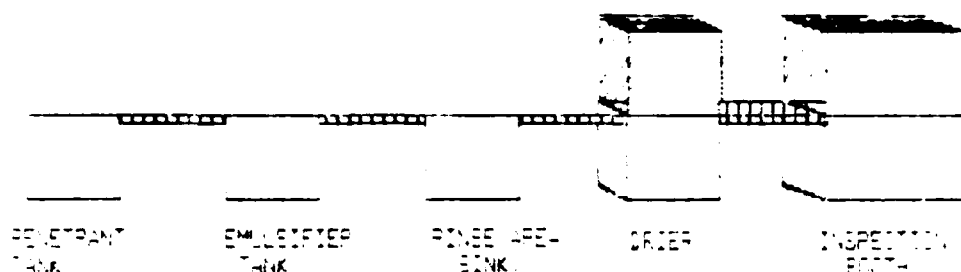


Figure 5. Penetrant Inspection Process

10. 108th Tire Shop/Repair & Reclamation Building: 33-22
 Shop Supervisor: MSgt Mastrogiovanni AUTOVON: 440-3088

108th Wheel and Tire shop personnel build and tear down wheel and tire assemblies. Wheels are stripped once a year (about three per month). This shop has one 100-gallon stripping tank containing B&B 9201 (NSN 8010-01-040-1059), with two inches of oil as a sealer to prevent evaporation, where wheels are soaked for 20-30 minutes, allowed to drain, and then rinsed off at the washrack. Waste stripper and sludge from the tank are pumped out and stored in 55-gallon drums before disposal as hazardous waste. This shop also has two PD-680 tanks, one tank (about 30-gallons) to clean bearings and another tank (about 100-gallons) to clean wheels. These tanks are cleaned out once a year and the waste PD-680 is stored in 55-gallon drums and sent to the NJANG waste storage area for disposal by contractor.

11. 108th Sheet Metal Building: 33-22
 Shop Supervisor: TSgt Green AUTOVON: 440-3322

This shop uses minimal amount of MEK for cleaning. No chemical wastes are generated from this shop.

12. 108th Motor Pool Building: 33-25
 Shop Supervisor: SMSgt Niwore AUTOVON: 440-4277

108th Motor Pool personnel service all NJ Air National Guard vehicles on McGuire AFB. Waste motor oil is placed in a 275-gallon above ground tank located next to the building. The tank is pumped out by a contractor. JP-4 is drained into a twelve-year old 750-gallon underground tank and is pumped out once a year by DEEV. Waste battery acid (about 5 gallons per month) is containerized and disposed of through DRMO. Waste PD-680 is mixed with waste oil and disposed of through DEEV.

13. 108th Weapons Maintenance
Shop Supervisor: SMSgt Phalen

Building: 33-31
AUTOVON: 440-4208/4347

108th Weapons Maintenance services F-4E armament systems. This shop was in the process of moving into a new building during the survey. The new facility has four PD-680 tanks (two will be heated). They will drain the spent PD-680 into 55-gallon drums and then transport these drums to the NJANG storage area for disposal by a contractor.

14. 108th AGE
Shop Supervisor: MSgt DePiero

Building: 33-43
AUTOVON: 440-3438

108th AGE shop personnel maintains all powered aerospace ground equipment for the 108th Squadron AGE. This shop has a very good system to handle waste oils and fluids at the shop (see Figures 6 and 7). Hydraulic fluid, lube jet engine oil, and turbine engine oil are placed in three containers inside the shop. These containers are connected to four 55-gallon drums located outside the building. This system is convenient, clean and allows reuse of drums. When the drums are full, the waste oils or fluids are taken to the NJANG waste storage area for disposal. Waste paints and thinners are stored in 55-gallon drums and disposed of as hazardous waste. Battery acid (about 5 gallons every 6 months) is placed in a plastic drum and turned over to DEEV for disposal. MSI aircraft cleaning compound (NSN 6850-00-935-0995) is diluted 10:1 and used to clean AGE equipment. The rinse water from this process enters the sewer system. The AGE shop also operates a 2000-gallon fiberglass underground tank fuel filtration system to reclaim uncontaminated fuel.

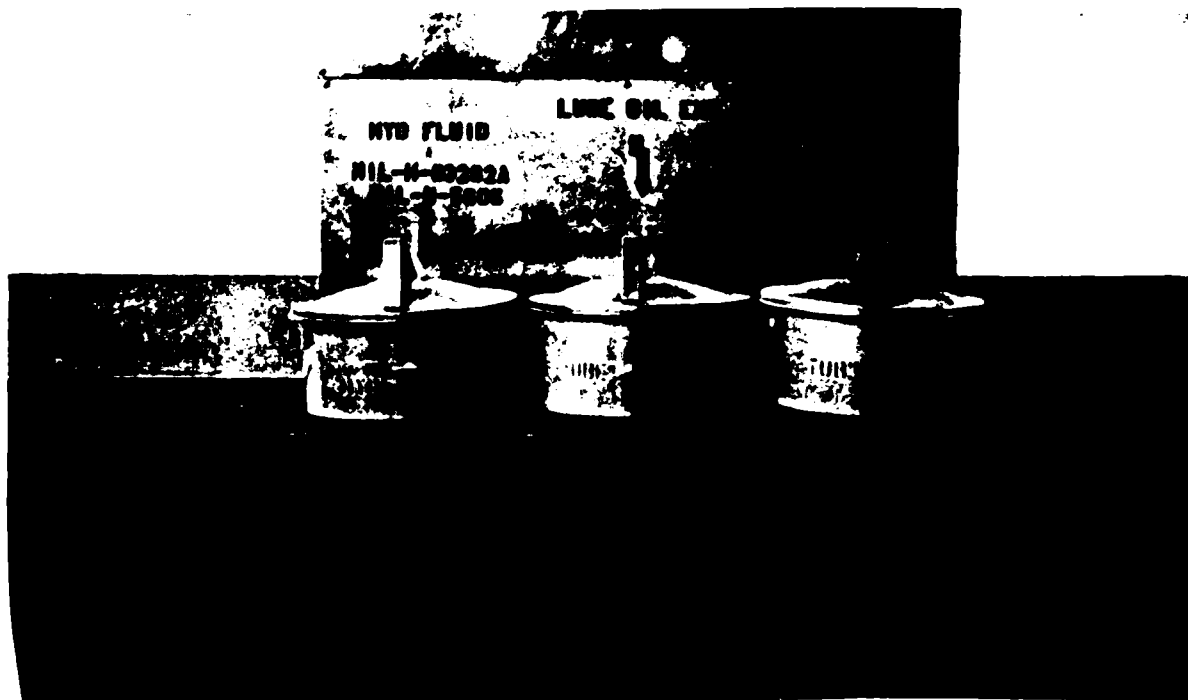


Figure 6. 108th AGE Interior Waste Canisters

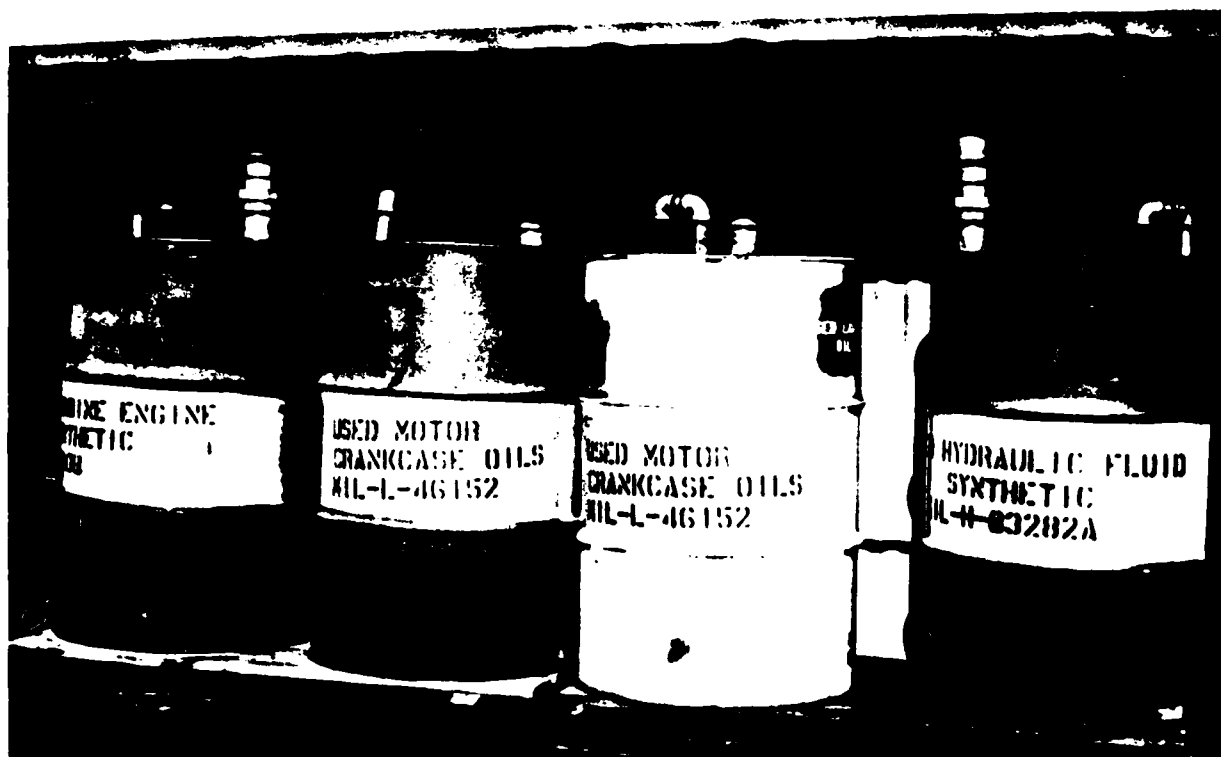


Figure 7. 108th AGE Waste Storage Area

15. 108th Fuel Cell
Shop Supervisor: TSgt Oliveri

Building: 33-50
AUTOVON: 440-4321

108th Fuel Cell personnel conduct the following operations: integral fuel tank repair, bladder fuel cell replacement and repair, component replacement, and external tank repair. Drained fuel from aircraft is recycled by the AGE shop. Spilled or waste fuel and oil is washed to a 1000-gallon underground holding tank which is pumped out once every two years. Minimal wastes (5 gallons JP-4 per month) are generated in this shop.

V. SUMMARY OF GENERAL WASTE DISPOSAL PRACTICES AT MAFB

The waste disposal practices for different categories of waste are summarized in this section. A shop-by-shop summary of disposal practices is contained in Appendix D.

1. Waste oil for the NJANG is taken to above ground tanks located behind the 108th Weapons Maintenance shop (Building 33-31). For the other shops on base, if a waste oil holding tank is not available at the shop, the waste oil is taken to two 2000-gallon underground tanks (one for synthetic oil and one

for heavy oils), Building 34-38. All waste oil tanks on base are pumped out by a contractor. In New Jersey, used oil is a hazardous waste.

2. Uncontaminated JP-4 is taken to the flight line where it is placed back into the fuel tanks by fuel maintenance personnel. Contaminated JP-4 is stored and sold to Brookhaven National Laboratories.

3. A large amount of PD-680 is used for degreasing operations. Currently, waste PD-680 is disposed of as nonhazardous waste. Waste PD-680 from most shops is placed in 55-gallon drums and taken to a designated 2000-gallon underground storage tank for waste PD-680, Building 34-38. This tank is pumped out by a contractor. PD-680 used at the AGE and aircraft washracks is hosed off and enters the sewer system along with aircraft soaps.

4. Waste hydraulic fluids generated on base are taken to a designated 2000-gallon underground storage tank for waste hydraulic fluid, Building 34-38; however, hydraulic fluid generated by the NJANG is taken to their waste storage area and placed in an above ground tank. Both tanks are pumped out by contractor.

5. Waste acetone is currently drummed, and stored at the hazardous waste storage yard, Building 23-10, and will be recycled when the new acetone recovery unit is operational. The unit was awaiting approval from the fire department during the survey.

6. Waste solvents (e.g., MEK, Penetone 755 and Penetone TPC) are drummed and disposed of as hazardous waste.

7. Used automotive fuel from the 438th and 170th AGE shops is filtered at the 108th AGE shop and reused.

8. Paint wastes and thinners are stored in 55-gallon drums and disposed of as hazardous waste.

9. Most waste strippers (e.g., B&B 9201, FO 621) are stored in 55-gallon drums and disposed of as hazardous waste. Stripping rinse water from the aircraft washrack is rinsed to the sewage system.

10. Most battery acids are neutralized and placed in 55-gallon drums before disposal as hazardous waste.

11. Most waste antifreeze is collected in drums and disposed of as hazardous waste.

12. Developer wastes are sent through a silver recovery unit before being discharged to the sewer system.

13. NDI waste (penetrant and emulsifier) are drummed and disposed of as hazardous waste.

14. Empty paint spray cans are vented down to atmospheric pressure (by holding the nozzle down till no air is leaving the can) and thrown in the trash.

15. Speedy dry, used to clean spilled chemicals, is normally thrown in the trash.

VI. OBSERVATIONS AND CONCLUSIONS

A. The hazardous waste program is informal and depends on substantial input from DEEV, i.e., DEEV inspects waste drums, completes paperwork, and samples wastes when necessary. The only tasks for shop personnel are contacting DEEV when wastes need to be turned-in and transporting the wastes to the hazardous waste storage yard or underground tanks.

B. Virtually no baseline chemical analyses exist to characterize waste streams. In New Jersey, laboratory certification is required for hazardous waste analysis.

C. Currently no complete listing of accumulation sites and site managers is available. Accumulation sites have not been officially designated because most wastes are removed within 90 days at these sites, and the state of New Jersey inspections have not focused on accumulation sites.

D. Most of the waste storage sites on base are not secured, curbed, or covered. However, DEEV is working to curb and secure most areas. Secured waste storage sites should discourage intentional or unintentional cross contamination of wastes (making a nonhazardous waste drum hazardous or visa versa). The 438th Jet Engine Shop, Building 18-01 (Figure 8), was working on securing their covered storage area. The 438th Refurbish shop, Building 32-10, waste storage area has curbing but no security (Figure 9). The 108th AGE shop constructed an excellent storage area and system for handling wastes. Four 55-gallon waste drums on pallets (Figure 7), located outside the building, are connected by piping to three canisters with lids (Figure 6), located inside the building. Waste oils are drained from the equipment into pans and poured into the canisters which drain directly into corresponding waste oil drum. This setup is clean, convenient and allows the drums to be reused.

E. Several shops on base have taken their own initiative to reduce or minimize waste. For example, the Fiberglass shop has recently purchased a solvent recovery unit (Figure 3) for recycling acetone. One 55-gallon drum of waste acetone is generated per week therefore, this unit will save the shop money by reducing the cost of purchasing and disposing acetone. Also, the Auto Hobby shop and the Vehicle Maintenance shop have procured Safety Kleen degreasing units (Figure 10). These units are serviced by Safety Kleen Corporation and therefore, relieves the base of purchasing and disposing the degreasant (normally PD-680).

F. The 438th Corrosion Control shop operates two stripping tanks located in Building 22-40. Small parts are placed in tanks, removed, placed on the floor and then hosed off into the floor drain system (Figure 2). Larger parts (too large to strip in the tanks) are coated with stripper, allowed to set and hosed off. The rinsate enters the floor drain.

G. DEEV samples unknown or questionable wastes to determine waste characteristics. Samples are collected using a plastic tube approximately 2.5 feet long and .25 inch in diameter. The waste sample is placed in vials and normally sent to USAFOEHL/SA for analysis.



Figure 8. 438th Jet Engine Maintenance Waste Storage Area

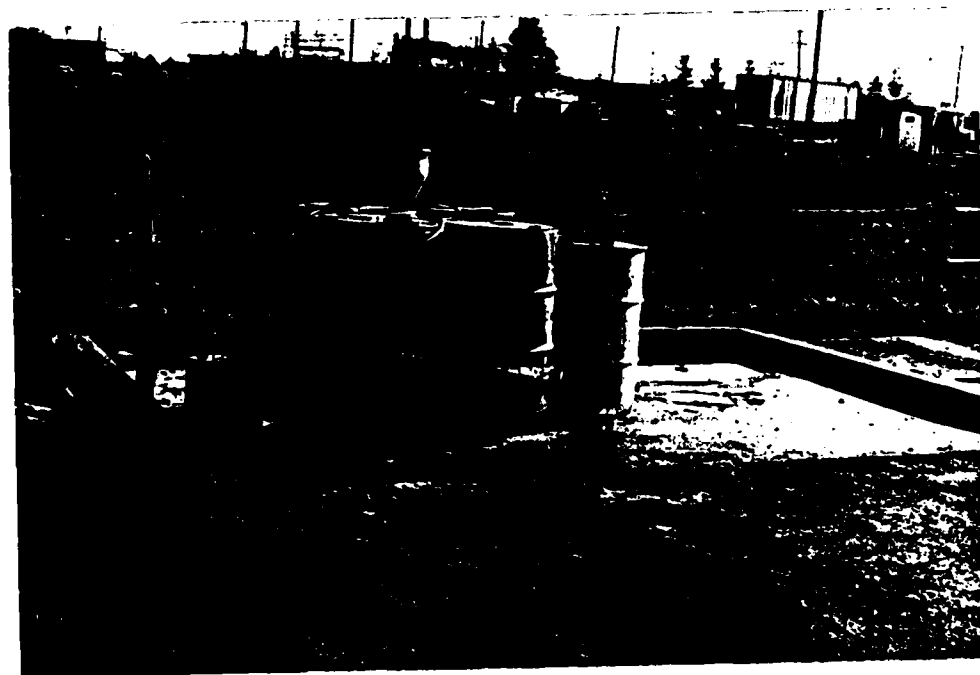


Figure 9. 438th Refurbish Shop Waste Storage Area



Figure 10. Safety Kleen Degreasing Unit

H. 170th AGE shop, Building 19-32, washes their equipment with a mixture of 50% PD-680 and 50% soap. Rinse water from this operation enters an oil/water separator connected to the sewer system.

I. The Allied Trades shop has a waterfall paint booth. When the system is cleaned, floating sludge is skimmed off, and the water (800-1000 gallons) is drained to the sewer. The waste sludge is thrown in the trash.

J. There is no formal training given to accumulation site managers.

K. The NJANG waste storage area (see Figures 11 and 12) is covered, curbed and secured (the tanks located in this area are locked). This storage area was clean and seems to be well maintained.

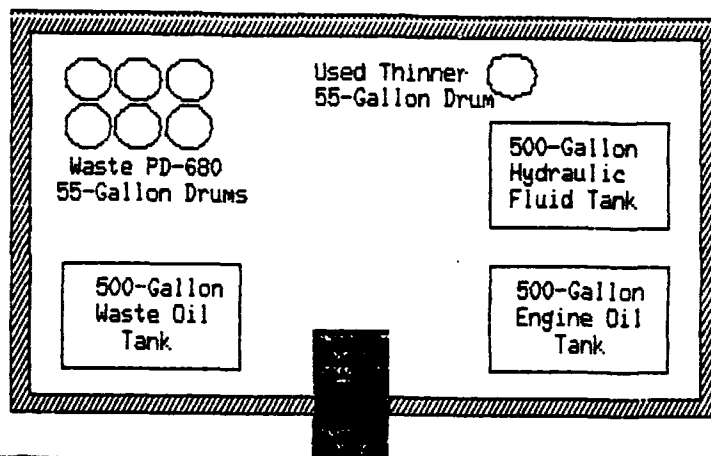


Figure 11. NJANG Waste Storage Area Layout



Figure 12. NJANG Waste Storage Area

L. The NJANG 170th Corrosion Control shop aircraft washrack employs a foam machine (Figure 13) to clean aircraft. The foam machine uses less aircraft soap because the foam stays in place when applied. Conventional cleaning methods require the soap to be reapplied as the dirty component is cleaned. For excessively dirty areas, PD-680 is used.

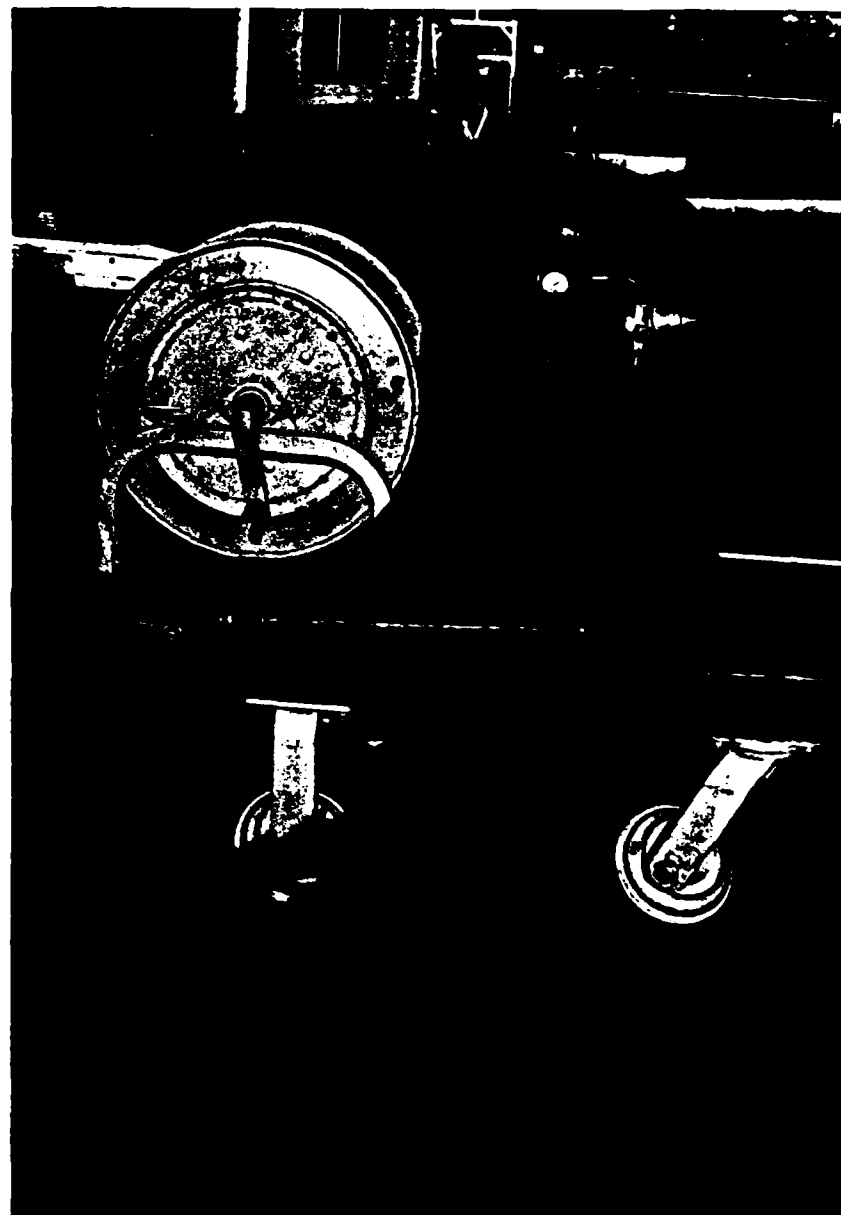


Figure 13. 170th Corrosion Control Foaming Unit

M. The 108th NJANG Corrosion Control washrack has noted an appreciable reduction in the use of PD-680. The excessive use of PD-680 has been circumvented by not storing PD-680 in the immediate washrack area. Now, washrack personnel need to go to the storage area and pump PD-680 from a 55-gallon drum into a manually pressurized applicator.

N. Big Blue, Building 32-09, has floor drains that are miniature oil/water separators (Figure 14) that empty into a creek near the flight line. Half of these separators were cleaned out last summer and the remaining ones are scheduled to be cleaned out this summer. Oil cans were said to be found in some of these separators.

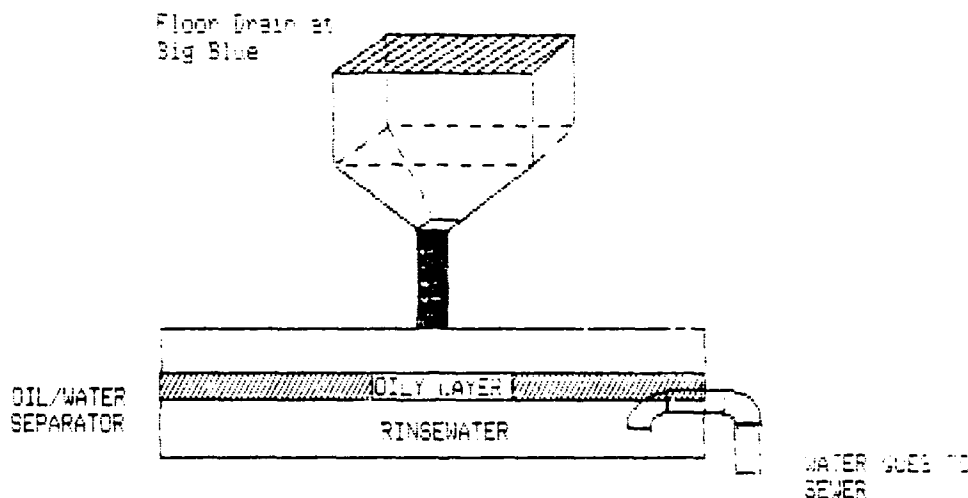


Figure 14. The Floor Drain System for Big Blue

O. The 438th Powered and Non-powered AGE shop (Building 22-53) wash equipment behind the shop (located next to the flight line). The rinse water from this washing operation drains onto the flight line skirt and eventually empties into a nearby creek.

P. DEEV plans to fill or remove all underground storage tanks on base and replace these tanks with above ground tanks.

Q. Supply generates about 30 drums a year of hazardous waste because of leakage and expired shelf-life items.

VII. RECOMMENDATIONS

A. The hazardous waste program currently relies heavily on DEEV's participation. This disproportionate input by DEEV tends to insure proper disposal of wastes, but greater participation by the Base Bioenvironmental

Engineering Shop along with personnel from using organizations will be necessary for refining or advancing the existing program.

Based on the proposed AFR 19-11, Hazardous Material/Waste Management, waste stream identification and analysis is a responsibility for the base bioenvironmental engineer. Also, the regulation specifies the waste generator, i.e., shop, is responsible for inspection, record keeping, and labeling of containers.

B. McGuire AFB needs to develop a waste analysis plan. This plan should consist of: a complete listing of all known waste streams with a brief description of the process or operation generating the waste; the results of a baseline chemical analysis (to fully characterize the waste); the required analysis frequency; the sampling technique; and the parameters of analysis (see Table 2). This type of sampling program will allow the base to establish, within a reasonable time, documented rationale for classifying each waste stream as either hazardous or nonhazardous. For example, neutralized battery acid is disposed of as hazardous waste yet, it has not been adequately analyzed for heavy metals to substantiate whether or not it is hazardous or nonhazardous.

C. The Bioenvironmental Engineer and the Environmental Coordinator should develop a comprehensive hazardous waste training and education program tailored specifically for the base. This should allow accumulation managers to become more responsive and supportive of the hazardous waste program.

D. A sample should be taken from the collection pit in Building 22-40 (the aircraft washrack and 438th Corrosion Controls stripping areas) to determine whether the discharge is indeed nonhazardous. (Note: Results of samples taken by the BEE shop after the survey [Table 3], showed that the discharge is nonhazardous).

E. A series of samples should be taken with both a coliwasa and the currently used sampling tube to determine if the tube is giving sample results comparable to a coliwasa. This will both ensure and document that representative waste samples are being taken.

F. 170th AGE (Building 19-32) personnel should re-evaluate their equipment washing techniques to determine if the amount of PD-680 used at the washrack can be reduced. Currently, a mixture of 50% PD-680 and 50% aircraft soap is being used. During the survey, shop personnel did not adequately explained why such a high percentage of PD-680 is necessary. In our opinion, the amount seems excessive.

G. The base should analyze neutralized battery acid for heavy metals (EP Toxicity). Presently, all neutralized battery acid is disposed of as hazardous waste. With the costliness of disposing it as hazardous waste, the base should proceed with more frequent analyses to determine whether all or some of the neutralized acid may be disposed of as nonhazardous waste. In fact, depending on initial results, it may be cost-effective to sample every drum of neutralized acid to identify those which can be disposed of as nonhazardous waste.

H. The wastewater from the waterfall paint booth at Allied Trades Paint Shop should be sampled over a period of time (before it is drained to the sewer system) to confirm that it is nonhazardous. The results from one sample taken during our visit showed that the wastewater is nonhazardous (see results in Table 3).

I. The base should start a program to test the integrity of its underground tanks. At a minimum, some kind of inventory control system should be implemented to detect any gross leakage.

J. Speedy dry used to clean chemical spills should be drummed and disposed of as hazardous waste.

K. The DEEV should put together a complete listing of accumulation sites and accumulation site managers. These managers should be of the rank of SSgt (or equivalent civilian rank) or higher who can handle the responsibility of managing these sites. (A partial listing of accumulation sites from our survey are listed in Table 4).

L. Similar to the 170th ANG, a focal point for the 108th ANG should be appointed to handle hazardous waste management.

M. Drums and bowlers at waste storage sites should be secured to prevent or discourage any intentional or unintentional mixing of wastes. Funding should be made available to upgrade each accumulation site with cover and curb.

N. The 438th Powered and Non-powered AGE wash area behind Building 22-53 should be hooked into an oil/water separator to reduce the amount of petroleum products and soaps that is washed onto the flightline from the cleaning of AGE equipment.

O. A sample should be taken from the 108th Propulsion shops carbon removing (sodium hydroxide) sink to assure that it is nonhazardous. Currently this decarbonizing operation is drained down the sink.

P. The current practice of disposing antifreeze as hazardous waste is unnecessary since antifreeze is biodegradable in the sewer system.

Q. The Test Cell uses approximately 300 gallons of oil per month that is run through an engine once for about half an hour. Oil recovery units such as Acquaneutics PHORS 18CA/300A may be a feasible alternative to recycle the oil instead of disposing of it. These units do not work on all oils therefore, the company sends a questionnaire (Appendix E) to the requester to determine whether or not the oil can be recycled.

Currently the base is disposing of this oil at a small cost. Should this situation change in the future these units may be a viable method for minimizing the amounts of oils disposed of at MAFB.

SHOP (BUILDING)	DESCRIPTION OF WASTE STREAM	BASELINE ANALYSIS (DATE)	EPA NO.	ANALYSIS FREQUENCY	SAMPLING TECHNIQUE	PARAMETERS
438TH TRANS ALLIED TRADES (3001)	WASTE PAINT FROM PAINT BOOTH	(DEC 85) FP-NH PH-NH, EP-NH RX-NH	NH	SEMIANNUALLY (PRIOR TO) (DRAINING)	DIPPER	FLASH POINT, PH LEAD, CHROMIUM
170TH CAMS AGE (1932)	NEUTRALIZED BATTERY ACID	(JAN 86) FP-NH, EP-NH PH-NH, RX-NH	NH	ANNUAL SPOT CHECK (EVERY OTHER DRUM)	COLIMASA	LEAD CADMIUM
438TH FMS CORROSION CONTROL (2240)	RINSEWATER FROM AIRCRAFT WASHING AND PAINT STRIPPING OPER. (COLLECTION PIT)	(JUN 85) FP-NH PH-H (1.5) RX-NH, EP-H (CHROMIUM, CADMIUM)	DO02 DO06 DO07	QUARTERLY CLEANOUT (DURING STRIPPING) (AND WASHING OPER.)	DIPPER	FLASH POINT, PH CHROMIUM, CADMIUM

LEGEND: FP - IGNITABILITY; PH - CORROSIVITY; RX - REACTIVITY; EP - EP TOXICITY;
H - HAZARDOUS; NH - NONHAZARDOUS

TABLE 2. EXAMPLE OF WASTE ANALYSIS PLAN

TABLE 3
SAMPLE ANALYSES RESULTS

CHEMICAL	438TH AIRCRAFT WASHRACK SAMPLE # (GN860378) (µg/L) (31 Dec 86)	170th AIRCRAFT WASHRACK SAMPLE # (GN860380) (µg/L) (31 Dec 86)	ALLIED TRADES WATERFALL SAMPLE # (GN860368) (µg/L) (4 Dec 86)	ALLIED TRADES WATERFALL SAMPLE # (GN860369) (µg/L) (4 Dec 86)
Oil and Grease	***	***		
Phenols	< 10	< 10		
Arsenic	< 10		70	< 10
Barium	< 1000		< 1000	< 1000
Cadmium	32		< 10	< 10
Chromium			< 50	< 50
Lead	< 20		< 20	< 20
Mercury	< 1		< 1	< 1
Selenium	< 10		< 10	< 10
Silver	< 10		< 10	< 10
Ignitable below 140° F			no	no
pH			6.5	6.5
Results of Analysis **	nonhazardous		nonhazardous (Mostly water)	nonhazardous (Mostly water)

** Compared results with 40 CFR 261
*** Samples were improperly collected

TABLE 4
PARTIAL LISTING OF HAZARDOUS WASTE ACCUMULATION SITES

<u>Shop</u>	<u>Building Number</u>
438th Jet Engine Shop	18-01
438th Test Cell (Fuel only)	18-32
438th Refueling Maintenance	18-36
438th Corrosion Control/Powered and Non-powered AGE	22-53
438th Transportation Shop	30-01
438th Refurbish shop	32-10
170th CAMs Corrosion Control (*TSgt Chuck Beam)	18-11
108th Motor Pool (Engine Oil)	33-25
108th AGE	33-43
Civil Engineering Oil Storage Area	34-38
Civil Engineering Hazardous Waste Storage Yard	23-10
New Jersey Air National Guard Hazardous Waste Storage Yard	

* Accumulation Point Manager for the 170th

References

1. Aquanetics, Inc., 111 Milbar Blvd., Farmingdale NY, "On-site Oil Reclamation Systems"
2. Equipment Technologies, Inc., Neptune Beach FL, "Electrical Powered Solvent Recovery EPAR II, III, & IV".
3. McGuire Air Force Base, "Hazardous Waste Management (HMW) Plan", date unknown
4. The Bureau of National Affairs, Inc., "Oil Reclaimed is Money Saved", Chemical Substances Control, No 151, 7 Jul 86.
5. United State Environmental Protection Agency "Identification and Listing of Hazardous Waste", 40 CFR 261.

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APPENDIX A
Request Letters

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APPENDIX A.

DEPARTMENT OF THE AIR FORCE

USAF CLINIC MCGUIRE (MAC)
MCGUIRE AIR FORCE BASE, NJ 08641-5300

REPLY TO

ATTN OF SGPB (AUTOVON 440-2411)

12 Aug 86

SUBJECT Request for a Hazardous Waste Assistance Survey

TO HQ MAC/SGPB/*W*
USAF OEHL/EC
IN TURN

1. This office, together with our Environmental Coordinator (438 ABG/DEEV), requests a Hazardous Waste Assistance Survey be performed on McGuire Air Force Base. We ask that you evaluate our hazardous waste management practices and help us explore options for hazardous waste minimization opportunities. This survey could be conducted either in conjunction with, or independent, of the Sewage Treatment Plant evaluation scheduled for mid October 1986.

2. In order to help you prepare for this visit, we are forwarding a copy of our Hazardous Waste Management Plan under separate cover.

3. Please contact me to fully coordinate this survey. Thank you for your attention to this matter.

FOR THE COMMANDER

David L. Wannig
DAVID L. WANNIGMAN, 2Lt, USAF, BSC
Chief, Bioenvironmental Engineering

cc: SG
SGP
438 ABG/DEEV

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APPENDIX B
Waste Disposal Form

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APPENDIX B.

Shop: _____
Shop Supervisor: _____

Building Number: _____
Autovon: _____

Shop Description: _____

CATEGORIES OF WASTE AND DISPOSAL METHODS

TYPE OF WASTE	DISPOSAL METHOD *(D,DD)	AMOUNT GENERATED (per month)	COMMENTS
1. PAINTS AND THINNERS			
2. DEVELOPER WASTES			
3. \$ STRIPPING WASTE			
4. BATTERY ACID			
5. \$ SOAPS			
6. \$ OILS			
7. FLUIDS			
Transmission			
Brake, Hydraulic			
8. FUELS			
Jet			
Automotive			
9. ANTIFREEZE			
10. \$ SOLVENTS			
11.			

\$ specify the types used on next page
* USED DISPOSAL CODES BELOW:

D-DRUMMED	RTT-RETURNED TO FUEL TANKS	UIP-USED IN PROCESS
DD-DOWN DRAIN	FTP-GOES TO FIRE TRAINING PIT	KIT-KEPT IN TANK
NDD-NEUTRALIZED FIRST THEN PLACED DOWN DRAIN		O-OTHER (specify)
RDD-RINSED OFF AND RINSEWATER GOES DOWN DRAIN		E-EVAPORATED
SRDD-SILVER RECOVERY UNIT THEN DOWN DRAIN		NA-NOT APPLICABLE

SPECIFIC CHEMICALS USED

STRIPPERS

<u>Name of Stripper</u>	<u>Manufacturer</u>	<u>Amt used</u>	<u>National Stock Number</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

SOLVENTS

<u>Name of Solvent</u>	<u>Manufacturer</u>	<u>Amt used</u>	<u>National Stock Number</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

SOAPS

<u>Name of Soap</u>	<u>Manufacturer</u>	<u>Amt used</u>	<u>National Stock Number</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

OILS

<u>Name of Oil</u>	<u>Manufacture</u>	<u>Amt used</u>	<u>Disposal Method</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

<u>Name of Oil</u>	<u>Manufacture</u>	<u>Amt used</u>	<u>Disposal Method</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Shop supervisors signature: _____

APPENDIX C

Summary of Wastes Generated

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SUMMARIZATION OF WASTES GENERATED AT MCGUIRE AFB

CATEGORY 1: WASTE OIL

ACTIVITY	PRODUCT	QTY/GALLONS
170th CAMS AGE	OE 10, OE 30, OE 50 Oils	660.000
Refueling Maintenance	15W-40, 6080W90 Oils	300.000
438th ABG Auto Hobby Shop	Motor Oils	5000.000
108th Weapons Maintenance	MIL-L-7870A, 8000 Oils	24.000
438th BME Base Motor Pool	10W, 30W Oils	720.000
438th Test Cell	1010 Oils	3888.000
436L	15W-40 Oil	960.000
108th Motor Pool	10W-40 Oil	600.000
438th FMS Repair/Reclamation	Penetrating, 5-56, Lube Oils	12.000
438th FMS Jet Engine Shop	Aircraft Lube And Turbine Oils	55.000
170th CAMS Corrosion Control	1010 Oil	100.000
108th AGE	15W-40 And HD 30 Oils	1440.000
438th LTC Fire Truck Maint.	Engine Oils	240.000
438th Powered/non-Powered AGE	Turbine, Engine And Penetrating Oils	2400.000
108th Propulsion Shop	7808 Oil	72.000
TOTAL:		17471.000

CATEGORY 2: JP-4 JET FUEL

ACTIVITY	PRODUCT	QTY/GALLONS
108th Motor Pool	Jet Fuel	600.000
438th Powered/non-Powered AGE	Jet Fuel	4500.000
108th AGE	Jet Fuel	2400.000
108th Test Cell	Jet Fuel	60.000
438th Test Cell	Jet Fuel	0.000
Refueling Maintenance	Jet Fuel	240.000
108th Fuel Cell	Jet Fuel	60.000
TOTAL:		7860.000

CATEGORY 3: PD-680

ACTIVITY	PRODUCT	QTY/GALLONS
108th Wheel and Tire Shop/R&R	PD-680	100.000
108th Propulsion Shop	PD-680	5.000
108th Corrosion Control	PD-680	240.000
108th AGE	PD-680	240.000
108th Motor Pool	PD-680	80.000
438th FMS Wheel and Tire Shop	PD-680	660.000
108th Weapons Maintenance	PD-680	300.000
170th CAMS Corrosion Control	PD-680	660.000
438th Powered/non-Powered AGE	PD-680	1320.000
438th FMS Jet Engine Shop	PD-680	220.000
170th CAMS AGE	PD-680	660.000
108th Pneudraulics	PD-680	240.000
TOTAL:		4725.000

CATEGORY 4: WASTE HYDRAULIC AND TRANSMISSION FLUIDS

ACTIVITY	PRODUCT	QTY/GALLONS
438th LTG Fire Truck Maint.	Hydraulic and Transmission Fluids	36.000
108th AGE	Aircraft Hydraulic Fluids	60.000
438th Powered/non-Powered AGE	Hydraulic Fluids	3600.000
436L	Hydraulic Fluids	180.000
108th Pneudraulics	Hydraulic Fluids	144.000
108th Propulsion Shop	Transmission Fluid	6.000
Refueling Maintenance	Transmission Fluid	300.000
438th FMS Jet Engine Shop	Calibrating Fluid	220.000
	TOTAL:	4546.000

CATEGORY 5: WASTE SOLVENTS

ACTIVITY	PRODUCT	QTY/GALLONS
438th Refurbish	MEK, Naptha, Lacquer Thinner	120.000
438th FMS Repair/Reclamation	Naptha	24.000
170th CAMS Corrosion Control	MEK	220.000
438th FMS Corrosion Control	MEK	180.000
108th Propulsion Shop	MEK	5.000
108th NDI	Trichloroethane	1.000
170th CAMS AGE	Trichloroethane	12.000
108th Weapons Maintenance	Trichloroethane	0.500
108th Propulsion Shop	Sodium Hydroxide	12.000
438th FMS Jet Engine Shop	Penetone 755	345.000
438th FMS Jet Engine Shop	Penetone TPC Solvent	345.000
	TOTAL:	1264.500

CATEGORY 6: AUTOMOTIVE FUEL

ACTIVITY	PRODUCT	QTY/GALLONS
108th AGE	Automotive Fuel	60.000
438th Powered/non-Powered AGE	Automotive Fuel	840.000
436L	Automotive Fuel	120.000
Refueling Maintenance	Automotive Fuel	60.000
	TOTAL:	1080.000

CATEGORY 7: PAINT WASTE AND THINNERS

ACTIVITY	PRODUCT	QTY/GALLONS
108th AGE	Paints And Thinners	24.000
108th Corrosion Control	Paints And Thinners	4.000
170th CAMS AGE	Paints And Thinners	12.000
438th Trans Allied Trades	Paints And Thinners	120.000
438th FMS Corrosion Control	Paints And Thinners	660.000
438th FMS Plastic Shop	Paints And Thinners	12.000
170th CAMS Corrosion Control	Paints And Thinners	120.000
108th Motor Pool	Paints And Thinners	12.000
438th Refurbish	Paints And Thinners	60.000
	TOTAL:	1024.000

CATEGORY 8: STRIPPING WASTE

ACTIVITY	PRODUCT	QTY/GALLONS
438th FMS Corrosion Control	B & B 50-75	630.000
170th CAMS Corrosion Control	B & B 1567, Hexel 606	165.000
108th Wheel and Tire Shop/R&R	B & B 9201	100.000
108th Propulsion Shop	Paint Remover	1.000
436L	Paint Remover	36.000
	TOTAL:	932.000

CATEGORY 9: BATTERY ACIDS

ACTIVITY	PRODUCT	QTY/GALLONS
108th AGE	Battery Acid	360.000
108th Motor Pool	Battery Acid	60.000
170th CAMS AGE	Battery Acid	48.000
	TOTAL:	468.000

CATEGORY 10: WASTE ANTIFREEZE

ACTIVITY	PRODUCT	QTY/GALLONS
438th LTG Fire Truck Maint.	Antifreeze	24.000
108th Motor Pool	Antifreeze	120.000
170th CAMS AGE	Antifreeze	110.000
Refueling Maintenance	Antifreeze	36.000
436L	Antifreeze	120.000
	TOTAL:	410.000

CATEGORY 11: DEVELOPER WASTE

ACTIVITY	PRODUCT	QTY/GALLONS
108th NDI	Developer Wastes	120.000
108th Corrosion Control	Developer Wastes	1.000
	TOTAL:	121.000

CATEGORY 12: NDI WASTES (PENETRANT AND EMULSIFIER)

ACTIVITY	PRODUCT	QTY/GALLONS
108th NDI	NDI Wastes	5.000
	TOTAL:	5.00

APPENDIX D

Waste Disposal Practices by Shop

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WASTE DISPOSAL PRACTICES BY SHOP

Building #	Shop	Types of Chemicals Disposed of by Shop	Disposal Method
17-08	438th LTG Fire Truck Maintenance	Waste Oil	D
		Waste Fluids	D
		Antifreeze	DD
17-50	463L	Stripping Waste	RDD
		Soaps	DD
		Waste Oils	D
		Waste Fluids	D
		Antifreeze	DD
		Automotive Fuels	D
18-01	438th FMS Jet Engine Shop	Soaps	DD
		Waste Oils	B
		Penetone 755	D
18-11	170th CAMS Corrosion Control Shop	Waste Paints and Thinners	D
		Stripping Waste	RDD/D
		Soaps	DD
		Waste Oils	D
		Jet Fuels	D
		Waste Solvents	RDD/D
18-31	438th FMS Test Cell	Soaps	RRD
		Waste Oils	D
		Waste Fluids	RRD
		Jet Fuel	AGT
		Waste Solvents	RDD
18-36	Refueling Maintenance	Paints and Thinners	UIP
		Soaps	RDD
		Waste Oils	D
		Jet Fuel	RDD
		Automotive Fuel	D
		Antifreeze	D

Note: See Legend Last Page

Waste Disposal Practice By Shop (Cont.)

Building #	Shop	Types of Chemicals Disposed of by Shop	Disposal Method
19-32	170th CAMS AGE	Paints and Thinners Battery Acid Soaps Waste Oils Waste Fluids Fuels Antifreeze PD-680	UIP ND RDD D UIP UIP D RDD/D
19-29	170th CAMS Jet Engine Shop	PD-680 Waste Fuels Waste Oils	D D D
19-31	170th CAMS Fuel Cell Repair	Waste MEK/EMK JP-4	D RTT/D
19-37	Survival Equipment	No Wastes	
19-13	438th MMS Munition Storage	No Wastes	
22-40	Aircraft Washrack/ Chemical Stripping Corrosion Control	Stripping Waste Soaps PD-680	RDD/D DD DD
22-53	438th Power and Non-powered AGE	Waste Oils Waste Fluids Jet Fuels Automotive Fuels PD-680	D D RTT/D RTT/FTP D
22-53	438th FMS Corrosion Control	Waste Paints and Thinners	D

Note: See Legend on Last Page

Waste Disposal Practice By Shop (Cont.)

Building #	Shop	Types of Chemicals Disposed of by Shop	Disposal Method
23-11	438th FMS Structural Repair	No Wastes	
23-15	438th FMS Plastic Shop	Acetone	RC/D
24-15	438th ABG Auto Hobby Shop	Soaps Waste Oils Waste Fluids Antifreeze Safety Kleen	DD UGT UGT DD SBC
30-01	438th B.M.E. Base Motor Pool	Paints Soaps Waste Oils Antifreeze	UIP RDD UGT UIP
30-01	438th Trans Allied Trades	Waste Paints and Thinners Soaps	D RDD
32-09	438th FMS Repair	Negligible wastes	
32-09	438th Wheel and Tire Shop	Soaps PD-680 Penetone 724	DD D D
32-10	Refurbish Shop	Waste Paints and Thinners Solvents	D D
33-21	108th Propulsion Shop	Paints and Thinners Soaps Waste Oils Jet Fuels PD-680	UIP DD D D D

Note: See Legend on Last Page

Waste Disposal Practice By Shop (Cont.)

Building #	Shop	Types of Chemicals Disposed of by Shop	Disposal Method
33-22	108th Pneudralics	Waste Fluids PD-680	D D
33-22	108th Corrosion Control	Waste Paints and Thinners Stripping Waste Soaps PD-680	D RRD RRD RRD
33-22	108th NDI	Developer Waste Waste Oils Solvents	UIP/SRDD/D/E E/UIP/RDD E/UIP
33-22	108th Wheel and Tire Shop	Stripping Waste PD-680	D D
33-22	108th Sheet Metal	No Chemicals used	
33-25	108th Motor Pool	Battery Acid Soaps Waste Oils Waste Fluids Jet Fuels Automotive Fuels Antifreeze PD-680	D RDD D D RTT UIP DD D
33-31	108th Weapons Maintenance	Waste Paints and Thinners Oils PD-680	UIP UIP D
33-43	108th AGE	Waste Paints and Thinners Battery Acid Soaps Waste Oils Waste Fluids Jet Fuels Automotive Fuels PD-680	D D RDD D D RTT RTT D
33-50	108th Fuel Cell	Waste Paints and Thinners Fuels	D KIT

Legend: RC - Recycled
FTP - Fire Training Pit
KIT - Kept in Tank
SBC - Serviced by Contractor
UGT - Underground Tank
RTT - Returned to Fuel Tanks

E - Evaporated
DD - Down Drain
ND - Neutralized and Drummed
ABG - Above Ground Tank
UIP - Used in Process
RDD - Rinsed off Down the Drain

B - Bowser
D - Drummed

APPENDIX E

Aquanetics Questionnaire

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AQUANETICS, INC.

ON-SITE OIL RECLAMATION SYSTEMS

111 Milbar Blvd., Farmingdale, NY 11735

(516) 454-7600

U.S.A.

TELEX: 64 5149 MIMCO, FDLE



OIL RECLAMATION APPLICATION DATA SHEET

NOTE: If more than one type of oil is used, or more than one plant location exists, please fill out a data sheet for each type of oil and plant location.

COMPANY NAME: _____ DATE: _____

ADDRESS: _____ COMPANY CONTACT: _____

CITY: _____ TITLE: _____

COUNTRY _____

TELEPHONE #: (_____) _____ TELEX: _____

1. TYPE OF INDUSTRY

Industrial Manufacturing ☐ Utilities ☐ Military ☐ Steel ☐
 Petro Chemical ☐ Plastics ☐ Mining ☐
 Automotive ☐ Refining ☐ Other (Please Specify) _____

2. HOW MANY OPERATING SHIFTS DAILY? One ☐ Two ☐ Three ☐

3. TYPE OF OIL

	VISCOSITY			
	at 100°F	at 210°F	at 45°C	at 100°C
Hydraulic				
Quench				
Turbine Lube				
Transformer				
Heat Transfer				
Gear				
Cutting				
Drawing				
Synthetic*				
Other*				

*Specify Type

4. WHAT IS THE BRAND NAME DESIGNATION OF THE OIL YOU WOULD LIKE TO PROCESS (e.g. Mobile DTE 24)? _____

5. WHAT TYPE OF MACHINERY IS PREDOMINANT IN YOUR FACILITY USING THE SUBJECT OIL?

Machine Tools ☐ Turbines ☐ Stamping ☐ Transformers ☐

Quench Tanks ☐ Plastic Injection Molding Equipment ☐

Other (Please Specify) _____

6. APPROXIMATELY HOW MUCH OIL DOES A RESERVOIR FOR A TYPICAL SYSTEM CONTAIN?

_____ gallons / _____ liters

7. HOW MANY SUCH SYSTEMS ARE THERE IN YOUR FACILITY?

_____ number

8. WHAT QUANTITY (YEARLY) IS BEING USED OR PURCHASED?

Less than 1,000 gals./ltrs. ☐

25,000 - 50,000 gals./ltrs. ☐

1,000 - 10,000 gals./ltrs. ☐

Over 50,000 gals./ltrs. ☐

10,000 - 25,000 gals./ltrs. ☐

Exact Quantity (if available) _____ gals./ltrs.

9. WHAT IS YOUR TOTAL OIL COST PER YEAR?

_____ x _____ = \$ _____
\$ Per gals./ltrs. Yearly Usage in gals./ltrs. Total Cost

10. IF YOU EMPLOY A CENTRAL RESERVOIR TO COLLECT WASTE OILS, WHAT SIZE IS IT?

500 gals./ltrs. ☐

10,000 gals./ltrs. ☐

1,000 gals./ltrs. ☐

Other _____ gals./ltrs.

- 10a. WHERE IS IT?

In Plant ☐ Underground ☐ Other (Please Specify) _____

- 10b. IS IT HEATED? Yes ☐ No ☐ IF YES, STATE TEMPERATURE _____°F/_____°C

- 10c. DOES THE WASTE OIL RESERVOIR CONTAIN A MIXTURE OF OILS OR PREDOMINANTLY ONE TYPE OF OIL? _____

- 10d. IF A MIXTURE, WOULD IT BE FEASIBLE TO ARRANGE TO SEGREGATE THESE OILS IF THERE WERE SUBSTANTIAL SAVINGS INVOLVED?

Yes ☐ No ☐

11. DO YOU OBTAIN OIL ANALYSIS* AND CHANGE TIME RECOMMENDATIONS?

Yes ☐ No ☐

- 11a. IF YES, FROM WHOM? _____

*If available, please attach a copy or a recent analysis of the oil to be processed.

12. HOW OFTEN ARE OIL CHANGES EXECUTED?

Every three months ☐ Yearly ☐
 Every six months ☐ Other (Please specify) _____

13. ON THE AVERAGE, WHAT IS THE APPEARANCE OF YOUR OIL WHEN YOU DISPOSE OF IT?

Clear ☐ Very Cloudy ☐
 Slightly Cloudy ☐ Muddy and Stratified with Contamination ☐

14. DOES YOUR OIL HAVE ANY SPECIAL PROBLEMS SUCH AS:

Water ☐ Entrained Gases ☐
 High Dirt Content ☐ High Acid Content ☐

IF YES: Please answer Question 14a (A, B, C & D)

IF NO: Please answer Question 14a (A, B)

14a. CAN YOU DESCRIBE THE FOLLOWING LEVELS OF CONTAMINATION FOR BOTH NEW OIL AND OIL TO BE RECLAIMED?

	New Oil	Oil To Be Reclaimed
A. Approximate Water Percent		
B. Approximate Dirt Content		
C. Entrained Gases - Flash Point		
D. Acids: Total Acid Number (TAN)		

14b. DOES YOUR WASTE OIL CONTAIN ANY SOLVENT? Yes ☐ No ☐

14c. IF YES, PLEASE SPECIFY _____

15. WHAT IS THE MAJOR REASON FOR PLANNED OIL CHANGES?

Regular Scheduled Change ☐ High Dirt Content ☐
 High Water Content ☐ Other (Please Specify) _____

16. HOW MUCH OIL DO YOU FEEL YOU CAN COLLECT PER WEEK FOR RECLAMATION?

_____ gallons/liters

17. WOULD YOU WANT THE OIL PROCESSED IN:

One Shift (8 Hours) ☐ Two Shifts ☐
 Other (Specify Hours) _____

18. IS COOLING WATER AVAILABLE? IF YES:

PRESSURE _____ psi FLOW _____ gpm/lpm TEMP _____ °F/°C

19. WHAT POWER IS AVAILABLE?

440V ☐ 220V ☐ Max. Amperage Avail. _____ Hertz: 60 ☐ 50 ☐
550 Vac ☐ 500 Vac ☐ 415 Vac ☐ 380 Vac ☐ 210 Vac ☐ Other: _____ Phase: 3 ☐ 1 ☐

20. DO YOU PRESENTLY HAVE EQUIPMENT IN YOUR FACILITY WHICH IS DESIGNATED TO CLEAN, FILTER OR RECLAIM OIL?

Yes ☐ (Please answer Questions 21-25) No ☐ (Please skip to Question 26)

21. IF YES, WHAT IS THE NAME OF THE MANUFACTURER OF THIS EQUIPMENT, AND THE MODEL NUMBER?

Manufacturer

Model Number

22. WHAT TYPE OF EQUIPMENT IS THIS?

Filtration System ☐ Vacuum Distillation System ☐

Centrifuge System ☐ Other (Please Specify) _____

23. HOW SATISFIED ARE YOU WITH THE PERFORMANCE OF THIS EQUIPMENT?

Very Satisfied ☐ Adequate ☐ Marginal ☐ Not Satisfied ☐

24. WHAT IS THE PROCESS RATE OF THIS EQUIPMENT IN GALLONS/HR.? — LITERS/HR.?

25. DO YOU FEEL THIS PROCESS RATE IS SUFFICIENT TO HANDLE YOUR PLANT'S REQUIREMENTS?

Yes ☐ No ☐

26. WHO IN YOUR ORGANIZATION IS RESPONSIBLE FOR CONTROLLING OIL USAGE AND COST?

27. DO YOU ANTICIPATE A NEED FOR INCREASED QUANTITIES OF OIL? IF SO, HOW MUCH?

5% ☐ 10% ☐ 15% ☐ Other _____%

28. ARE YOU INTERESTED IN PLANT WIDE RECLAMATION OR FOR CLEANING OIL IN A PARTICULAR PIECE OF EQUIPMENT? _____

.....

Thank you for your assistance in helping us to more accurately respond to your needs.

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